ALFALFA FOR HAY, SILAGE AND PASTURE

ALFALFA is becoming increasingly important as a farm crop in Canada. Its high protein and mineral content make it a particularly valuable feed during wartime, when good protein feeds are not too plentiful. It is a high-yielding hay crop, an excellent pasture crop where bloating is not too serious, a highly nutritious silage crop, and it possesses the power to increase the nitrogen content of the soil.

Alfalfa is adaptable to a wide range of climatic and soil conditions and can be grown in practically all mixed-farming areas in Canada. It is drought-resistant but will not thrive on poorly drained or acid soils. It is particularly susceptible to injury where ice sheets form during the winter.

Alfalfa is a legume, perennial in habit (that is, it is not short-lived like red clover) and in growth it ranges from two to four feet in height. The stems, which bear short leafy branches, arise from the crown each spring and after each cutting. The flowers are in short, somewhat one-sided clusters. While self-fertilization of the flower may occur, as in the pea plant, cross-fertilization is more usual and is brought about by the visits of wild bees.

The main tap roots of alfalfa are very long and in plants several years old they may penetrate the soil 10 to 15 feet. A large number of secondary roots branch off from the main tap root and on these secondary roots are found the nodules typical of the leguminous plants. The nitrifying bacteria present in these nodules are able to obtain and store free nitrogen from the air which benefits the alfalfa plant and associated grasses and leaves a residual effect for succeeding crops.

Varieties

Ontario (Canadian) Variegated.—This variety is semi-upright in growth habit and contains about 10 per cent of plants with a variegated flower colour. It is fairly hardy and productive. It is the most widely grown variety in Eastern Canada but under Western conditions it has not proved to be so hardy as Grimm.

Grimm.—Grimm resembles Ontario Variegated closely in appearance and yield. Due to the merit of hardiness, it is the leading variety in Western Canada.

Ladak.—Ladak was introduced to Canada in 1925 and shows considerably more variation in growth habit and flower colour than Grimm. One of its outstanding characteristics is its ability to yield an exceptionally heavy first crop, making it especially valuable in northern areas where only one crop of hay is normally obtained.

Other "Variegated" varieties are Cossack, Baltic, Hardigan, Hardistan, Macsel and Viking. Seed of these varieties is more difficult to obtain than n or Ontario Variegated.

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Yield Tests of Alfalfa for Hay

Yield trials of different varieties of alfalfa have been conducted periodically by the Division of Forage Plants at various Dominion Experimental Farms and Stations throughout Canada. In one standardized test conducted at 9 stations, during the years 1933-36 inclusively, Grimm and Ontario Variegated yielded equally well at most stations, but at stations in which winters were severe Grimm outyielded Ontario Variegated. The Ladak variety ranked the highest in yield of hay at six stations, second at two and third at one.

Methods of Growing Alfalfa

Rotation.—Alfalfa, being a perennial plant, can be fitted into either a short or a long rotation as desired. Since it will provide hay, pasture or silage, it can be very satisfactorily used in a relatively long rotation with other crops to produce feed for dairy stock. On the other hand, it is an excellent soil-building crop and is useful in a short rotation with other cash crops or where a predominance of grain is required in a combined dairying and hog-raising enterprise. It may also be adapted to other types of rotation.

Preparation of the Soil.—While alfalfa will compete successfully with many of the common weeds, it usually grows best following a hoed crop or summer-fallow which is relatively free of weeds. In Eastern Canada, hoed-crop land may be fall ploughed or cultivated, and in the spring the soil should be cultivated to provide a finely tilled but relatively firm seed-bed. The alfalfa should then be seeded not more than ½ inch deep with a nurse crop of wheat, oats or barley. This may be done with a seed-drill, with a grass-seed attachment broadcasting the alfalfa, which may afterwards be covered by harrowing or rolling.

In Western Canada, the crop is usually seeded after a summer-fallow. Spring cultivation should be shallow so as not to make a deep, loose seed-bed. Seeding may be done, usually without a nurse crop, any time from May 15 to June 30. In regions of higher rainfall, a nurse crop may be used. The seed may be mixed with cracked wheat, barley or rye, and seeded about 1 to 1½ inches deep with an ordinary grain drill or press drill. Packing or rolling after seeding is advisable. In very dry areas, alfalfa is frequently seeded in drills 30 to 36 inches apart.

Commercial Fertilizer and Lime for Alfalfa.—Alfalfa is a legume and is able to obtain nitrogen from the air and store it in nodules on its roots to be released later into the soil. It thus increases the soil nitrogen. It also acts as a soil builder and conditioner by adding organic matter and improving the physical condition of the soil. On the other hand, it is a gross feeder on phosphorus, potash, and calcium. It will thus respond to applications of phosphoric and potassic fertilizers, such as commercial 0-12-6 or 0-12-10 mixtures. On sour or acid soils it is also necessary to apply ground limestone, as alfalfa will not thrive on an acid soil. A normal application of limestone is from 1 to 2 tons per acre.

Seed Mixtures.—It is usually desirable to seed alfalfa in a mixture with other grasses and clovers, since the other species may survive and still produce a stand of crop should the alfalfa be killed out. A mixture also provides a more balanced feed ration, and grasses tend to reduce the danger of bloating in animals pastured in alfalfa. A suitable mixture for hay or pasture in Eastern Canada is made up of 6 pounds of red clover, 2 pounds of alsike, 6 pounds of timothy, and 6 pounds of alfalfa, seeded at the rate of 20 pounds per acre. If seeded alone, alfalfa should be sown at the rate of 10 to 15 pounds per acre. In Western Canada, common mixtures include 6 pounds per acre of alfalfa mixed with an equivalent amount of western rye grass, brome grass, or crested wheat grass, or with 3 pounds of timothy.

Where alfalfa is being grown for the first time, it should be inoculated with a bacterial culture to promote the development of the proper nitrifying bacteria without which the crop will not thrive. These cultures may be obtained from most of the larger seed houses.

Harvesting Alfalfa Hay

If properly handled, alfalfa hay is one of the most economical and highly nutritious forage crops which can be grown on the farm. One of its chief advantages is its relatively high protein content, which may range from 10 to over 20 per cent of the dry matter of the plant. It also contains a considerable quantity of the minerals calcium and phosphorus. All of these constituents are higher when the crop is cut when comparatively immature. *The recommended stage for cutting is when the plants are about one-tenth in bloom.* This allows for two cuttings per year in most parts of Canada. Cutting a third time is often followed by severe winter killing.

Curing.—In the curing of alfalfa the moisture content must be reduced from its 70 to 75 per cent when cut, to about 22 per cent before it is safe to store. Since the stems dry out more slowly than the leaves, it is difficult to cure alfalfa without losing a considerable amount of the dry brittle leaves. Because the leaves contain a higher proportion of nutrients than do the stems, it is important that as much as possible of the leafy material be saved.

In regions or seasons in which relatively dry conditions prevail, the most suitable method of curing the hay is by partially curing in the swath, followed by window curing. The alfalfa may be cut in the morning and allowed to wilt for 4 or 5 hours. After wilting, the hay may be raked into windrows, with two swaths to a windrow. A side-delivery rake is most suitable for this purpose, as it rolls the hay with the leaves chiefly in the centre of the windrow and the stems to the outside, thus promoting more uniform drying. The hay may be left in the window from one to two days, depending on drying conditions, with perhaps one turning with the rake. Then it may be gathered for stacking or storing in the barn by means of a hay loader or a sweep rake and overshot stacker.

Under more humid conditions, haying is much more difficult. Rains are more frequent and the dew is heavy, thus prolonging the drying period. Under these conditions it is usually necessary to include an intermediate treatment of coiling. Instead of completing the drying process in the windrow, the hay may be partially cured in the windrow and then coiled and left until the curing process is completed, when the crop may be drawn to the barn or stack. With this method, more labour is required, but the coils shed rain and the hay suffers less damage than if exposed to rain in the swath or windrow. Under extremely unfavourable weather conditions with very frequent rains, it may be necessary to use waterproof caps to cover the coils. Tripods may also be used on which the hay may be coiled and left for several weeks, if necessary, with comparatively little damage resulting.

Alfalfa for Silage

There has been considerable interest in recent years in the use of legume crops for silage. Alfalfa, being one of the highest yielding legumes, promises to become rather popular for this purpose. It is difficult to ensile, however, because of its high proportion of protein, and it is necessary to take certain precautions. When molasses is available, the addition of about 60 pounds of this high-carbohydrate material per ton of alfalfa at the time of ensiling ensures a good quality of silage. Other materials rich in carbohydrates may also be added with good results. Grasses such as timothy or couch grass make ensiling easier, and barley or cornmeal at 60 to 80 pounds per ton may be helpful. Good silage may also be made from alfalfa alone if cut in the full bloom stage and ensiled with approximately 65 per cent of moisture.

Alfalfa as a Pasture Crop

As pasture for cattle, horses, sheep, pigs or poultry, few, if any, plants excel alfalfa. A mixture of grass and alfalfa is best for this purpose. Careful management of the live stock is necessary when pasturing alfalfa, since the crop may be injured by over-grazing, particularly in the late summer or fall. The crop should not be grazed closer than 4 inches from the ground at any time. In the fall, pasturing should be discontinued early enough to allow for a growth of about 8 or 10 inches, in order that the plant may build up a food reserve in its roots to enable it to withstand severe winter conditions.

To avoid danger from bloating, animals should be well fed before turning on alfalfa the first time. Water and salt should be accessible at all times, and access to some form of dry fodder may also reduce the danger.

Alfalfa Seed Production

There are certain definite areas in Canada which have been found by experience to be well suited to alfalfa seed production. These areas are characterized by prolonged dry weather during that part of summer when the alfalfa is in bloom. There is a considerable element of chance in alfalfa seed production, and the early promise of a good seed crop is often not borne out by yield results. A great many factors, such as soil and weather conditions, presence of pollinating insects, and absence of destructive pests, must all combine favourably to produce a good seed crop.

The recommendations for establishing a good stand for hay apply with some modifications when seed production is the object. The rate of seeding should be less to secure a thinner stand which favours seed setting. In portions of the Prairie Provinces where semi-arid conditions prevail it has been shown that alfalfa seed may be produced profitably from seeded rows spaced 36-42 inches apart.

The first crop is now customarily taken for seed in both Eastern and Western Canada. Due to the prolonged flowering period with the consequent uneven ripening of the pods, it is sometimes difficult to decide when to cut the crop. If left standing too long to allow all the green pods to ripen, the more mature pods will start shattering. Experience has shown that most seed will be saved if the crop is cut when about half to two-thirds of the pods are brown.

The best machinery for harvesting and threshing the seed crop is the self-rake reaper and the clover huller. However, the more commonly used farm machinery may be adapted for the purpose. If a mower is used, a bunching attachment to the cutter bar will throw the swath out of the way of the next round. The ordinary binder with the twine removed may also be used, and the alfalfa can be bunched by means of the sheaf carrier. The grain thresher, when fitted with alfalfa sieves and with the concaves adjusted close to the cylinder, has proved to be quite effective for threshing. The crop should be quite dry when threshed and fed slowly through the machine.

The grower should familiarize himself with the requirements of the Dominion Seeds Act both as to source of seed for establishment and the requirements to be met in order that the seed crop may be registered. This information may be obtained direct from the Production Service, Department of Agriculture, Ottawa, Canada.

Alfalfa Under Irrigation

Alfalfa is the principal, and in many instances the only, hay crop grown on irrigated lands of the Prairie Provinces. Alfalfa requires a constant supply of moisture for continuous growth, and to ensure this it is usually necessary to irrigate thoroughly for each cutting on heavy soils and in dry seasons twice for each cutting on light soils. A common practice is to irrigate early in the spring for the first cut and then again immediately after the crop is removed to provide moisture for the second cut.

It is desirable to have the land well levelled before seeding to facilitate ease and rapidity in irrigation and to ensure complete surface drainage so that no ponds will form on the field. Alfalfa will not stand excess water or a water logged condition for any length of time. It is recommended in the irrigation districts that grain be seeded the first year. The alfalfa seed may then be drilled directly into the stubble in August, immediately after the grain is harvested. If grasshoppers are prevalent, the seeding may be left until early spring. The stubble does not require cultivating, either before or after drilling. Seeding with a nurse crop, although a common practice, is not generally recommended.

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